

4. Enter the new offset and slope in the CTD's configuration (.con) file. Instructions are provided below for modifying the .con file using SBE Data Processing (in SEASOFT-Win32):
  - A. Once you have installed SBE Data Processing, click on SBEDataProce.exe.
  - B. In the Configure menu, select the applicable CTD.
  - C. In the dialog box, click Open and select the applicable .con file for the CTD.
  - D. In the sensor list, double click on the pH sensor.
  - E. Enter the new offset and slope in the dialog box and click OK.
  - F. Click Save or Save As to save the changed .con file.

## Appendix - Derivation of Sea-Bird Equation

$$V_{out} = \text{offset} + [ \text{slope} * (R * T / F) * \ln(10) * (pH - 7) ]$$

Where

R = gas constant = 8.31434

F = Faraday constant =  $9.64867 \times 10^{-4}$

T = temperature (°K)

V<sub>out</sub> = output voltage from pH sensor (0 - 5 volts)

Substituting for R, F, and ln(10):

$$V_{out} = \text{offset} + [ \text{slope} * 1.98416 \times 10^{-4} * T * (pH - 7) ]$$

Therefore,

$$pH = 7 + (V_{out} - \text{offset}) / (1.98416 \times 10^{-4} \times T * \text{slope})$$